

633-15

INSTANTANEOUS
HOT WATER

The
RUUD

MULTI-COPPER-COIL
AUTOMATIC
STORAGE
SYSTEM

for
ARTIFICIAL GAS



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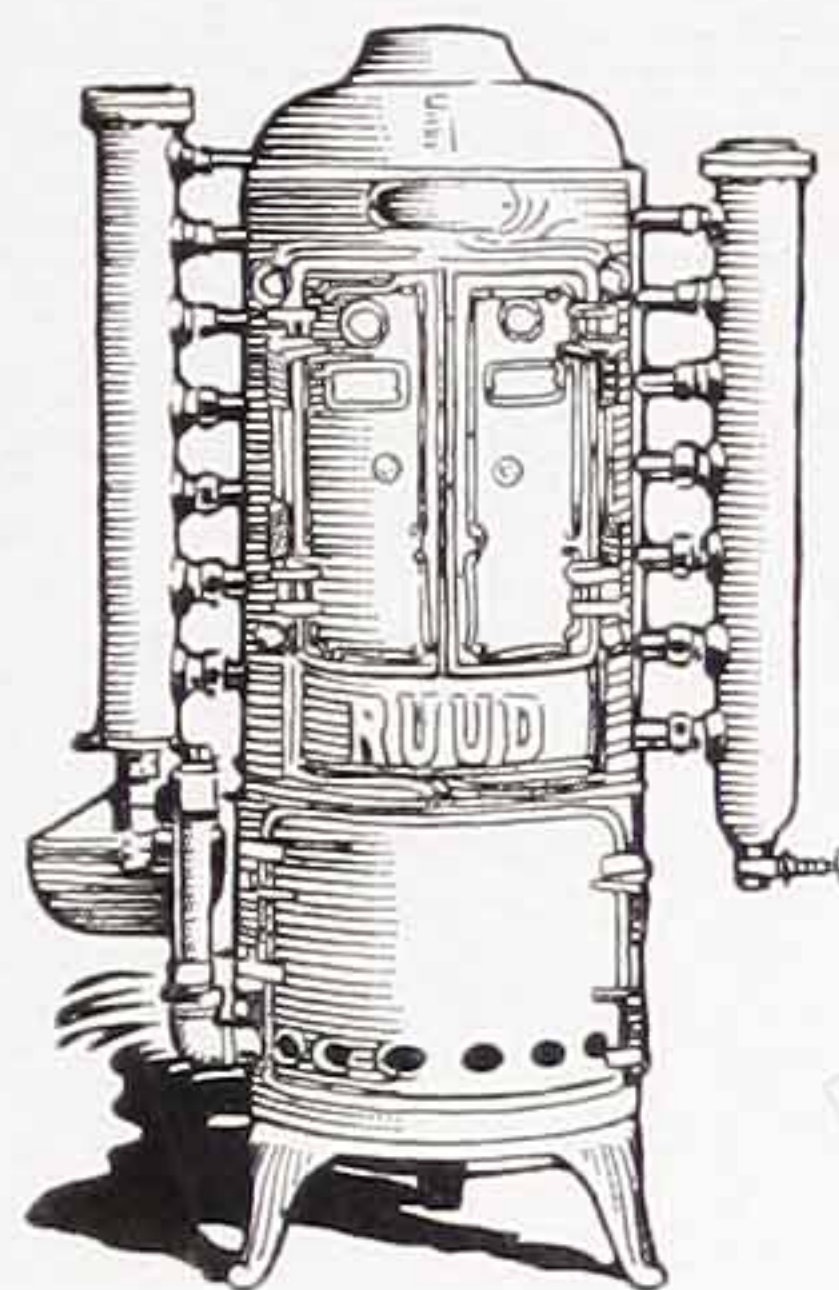
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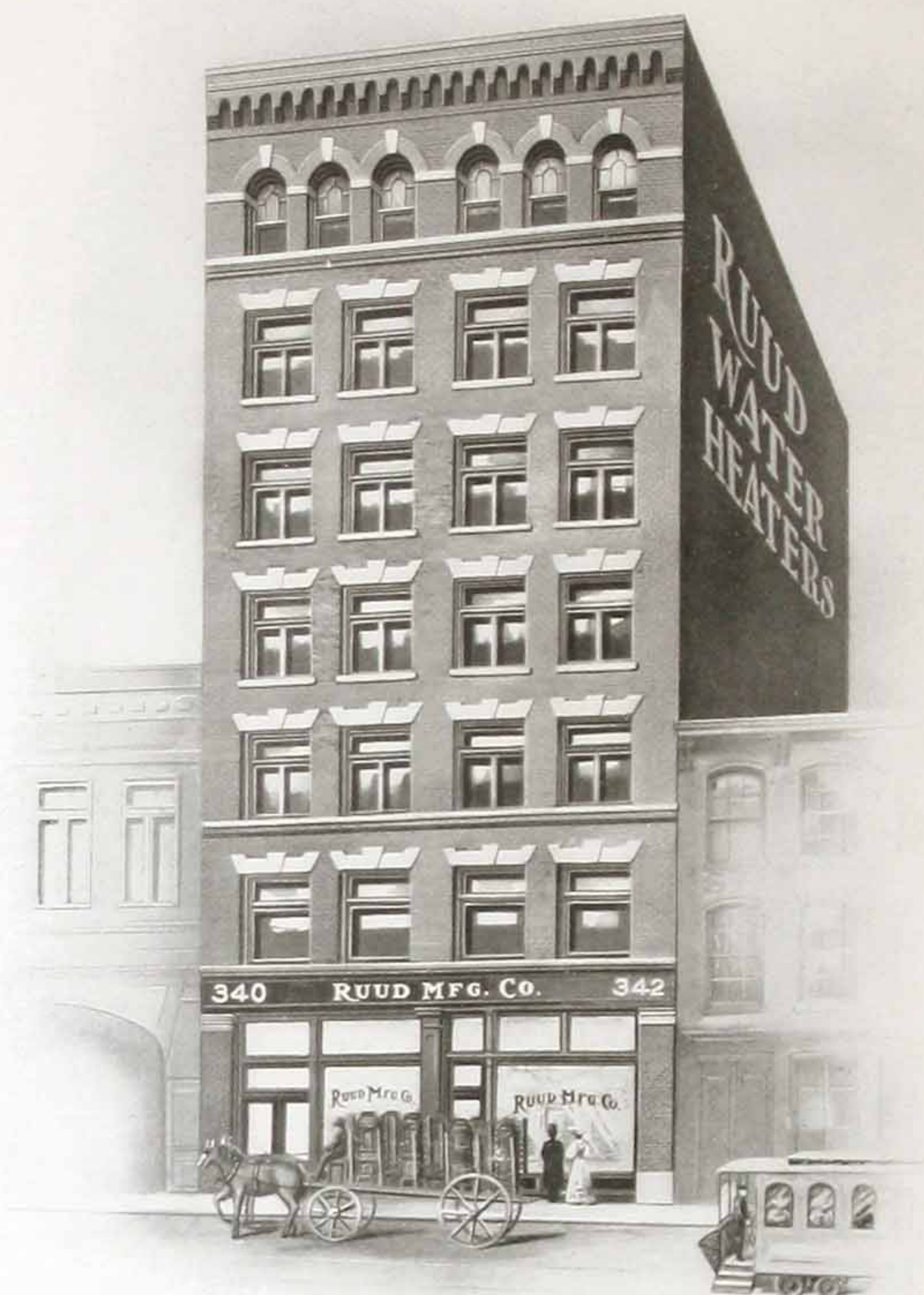
633-15

Hot Water

In Large Quantities
as rapidly as can be drawn

Especially Suitable for
Apartment Buildings
Large Residences, Hotels
Hospitals, Gymnasiums
Factories, Laundries :: ::





**General Offices and Factory
The Ruud Building**

U. S. Branches

Toledo	340 Erie Street	Buffalo	41 Court Street
Boston	10 Lincoln Street	New York	81 Fulton Street
Philadelphia	1938 Market Street	Detroit	206 Jefferson Avenue
Cincinnati	1003-1005 Elm Street	Louisville	246 Fifth Street
Indianapolis	45 South Pennsylvania Street	Milwaukee	136 Oneida Street
Chicago	85 East Lake Street	St. Louis	1019 Locust Street
Kansas City	1332 Main Street	Dallas, Texas	368 Commerce Street
Columbus	346 North High Street	Cleveland (old No.)	285 Prospect Avenue
Los Angeles, 829 Herman W. Hellman Building		San Francisco, 250 Delbert Block, Van Ness and Ofarrell Streets	

Canadian Branch: 155 King Street, West, Toronto

European Factory and Depots

Ruud Heisswasser Apparatebau

Schanzenstrasse 75, Hamburg, Germany

English Branch: 28, Audrey House, Ely Place, Holborn Circus, London, E. C.

The Ruud Multi-Copper-Coil Automatic Storage System

For Artificial Gas

*Catalogue X, Superseding all Previous Prices and Lists
Second Edition August 1907 20-M*

U. S. Patents

December 30 1890	September 6 1898	May 31 . 1904
September 29 1891	June 4 . 1901	May 16 . 1905
October 29 1895	September 10 1901	May 14 . 1907
April 7 . 1896	February 23 1904	Others pending

Also protected by British, Canadian, French, German, Austrian and Russian Patents

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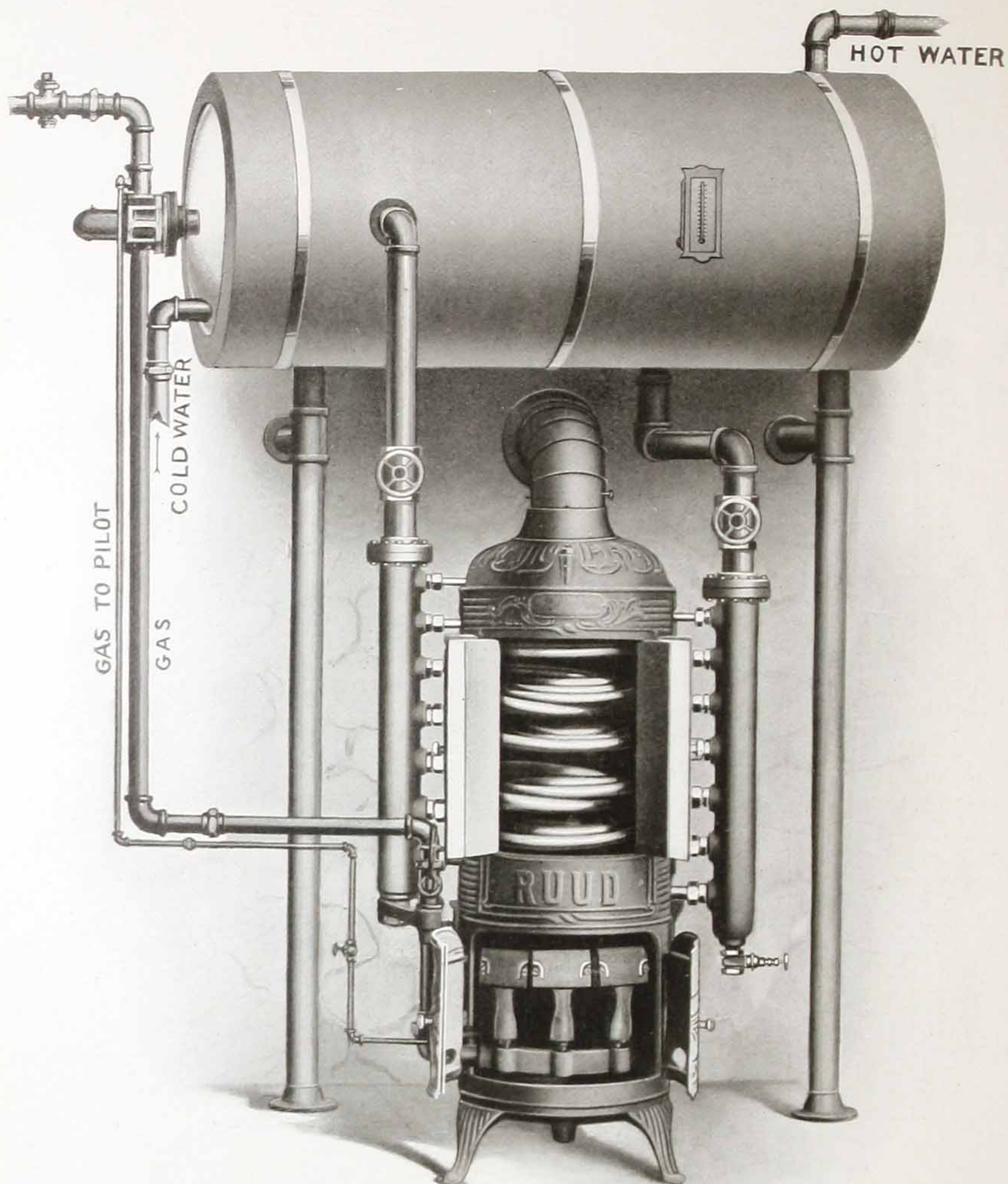
Our Guarantee With adequate gas and water supplies, the Ruud Storage System (of proper size) will supply hot water in large quantities at any desired temperature, winter or summer, with a very reasonable consumption of gas. We guarantee both workmanship and material for a period of one year from date of installation, and, furthermore, warrant our system unequalled in hot water capacity and service, and superior in gas efficiency to any storage system on the market.

A Guarantee that Guarantees

Ruud Manufacturing Company

The Ruud Building

336, 338, 340 and 342 Second Avenue, Pittsburgh, Pa., U. S. A.



Showing the System installed complete
Spring doors opened to show simplicity and accessibility

General Information



THE original Ruud Automatic Storage System (for natural gas) was invented by Mr. Edwin Ruud, the noted mechanical engineer, in 1890. The present system thus embodies the results of seventeen years of development and experience, and it is therefore only natural that it should have been brought to a very high point of perfection. There are now over twenty-five hundred Ruud Storage Systems in use.

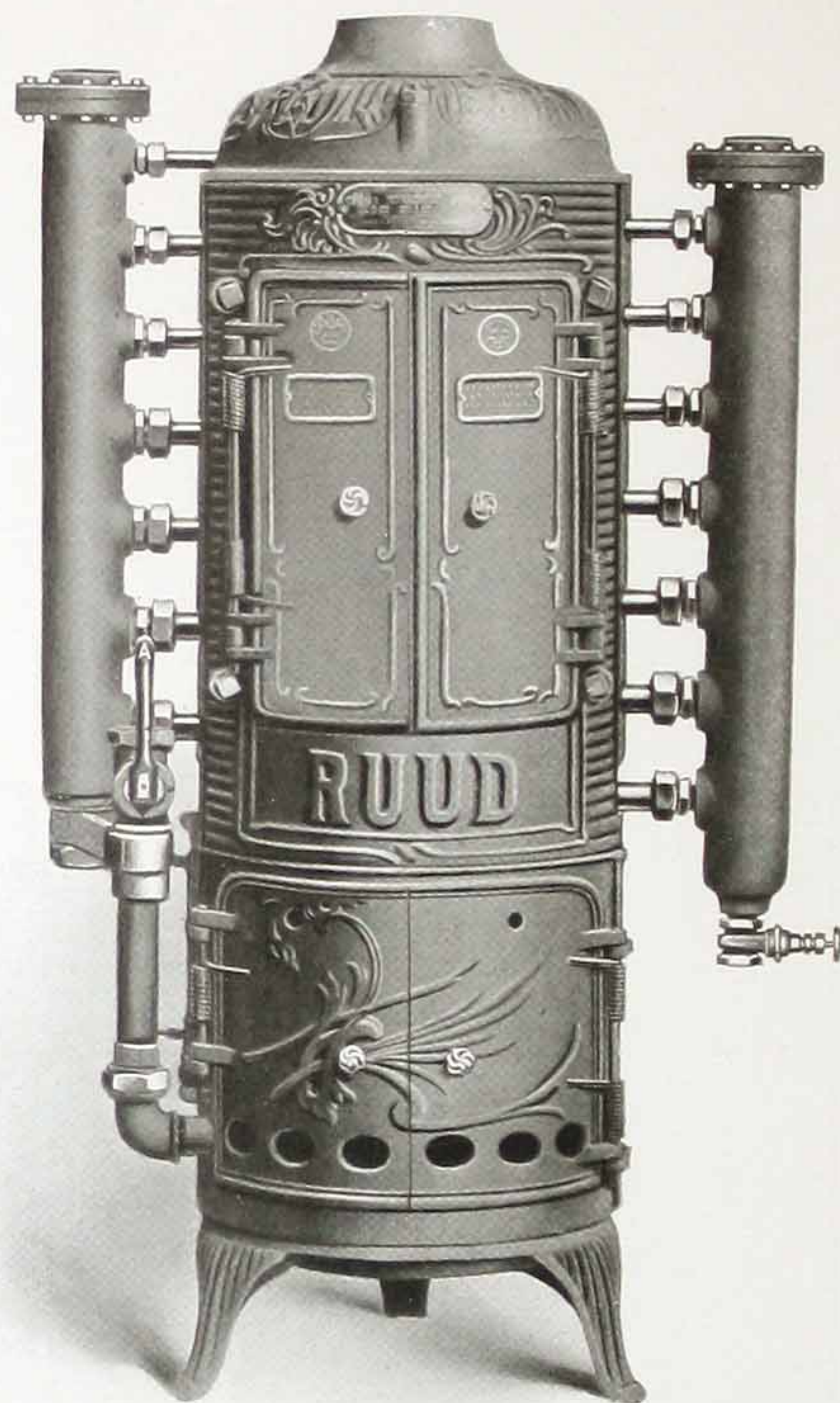
Previous to the invention of the Ruud Thermostatic Moment-Valve System in 1905, many attempts had been made by heating engineers to put out an efficient and economical storage system to work with artificial gas. No successful plan, however, was devised, due to the fact that the continuous "heat losses" caused by the heating surface radiation and convection in the heater through the draft of the chimney, frustrated all attempts toward a successful issue.

These great heat losses become plain even to the layman when it is considered that the heat of the chimney and heater had to be kept up twenty-four hours of the day, when the *actual* heating operation *could* have been accomplished in less than an hour's time.

It was reserved for Mr. Ruud, however, to see, understand and overcome these inherent defects, and, by a very simple yet wonderful invention, he succeeded in cutting out these "chimney losses," and produced a hot water storage heater of *very high efficiency*, even approaching that of our well-known Instantaneous Automatic Heater.

Engineers and experts recognize this as the storage system of the future, and we are confident that the invention constitutes as great an improvement in the storage field as our Instantaneous Automatic Water Heater (of which we now have over 30,000 in use) was an improvement over the old ways of heating water.

11090-8483 TCF



Showing the Multi-Copper-Coil Storage Heater
Doors closed

Its Application and Uses

When installed in private residences, apartment buildings, small hotels, hospitals and gymnasiums, the Ruud Storage System will continuously supply *hot water* in large quantities for any and all purposes at a uniform even temperature.

Hot water from every faucet at the same time.

Supplies five faucets or fifty.

Hot water always available in response to the simple turn of any faucet. Never too hot—never cold.

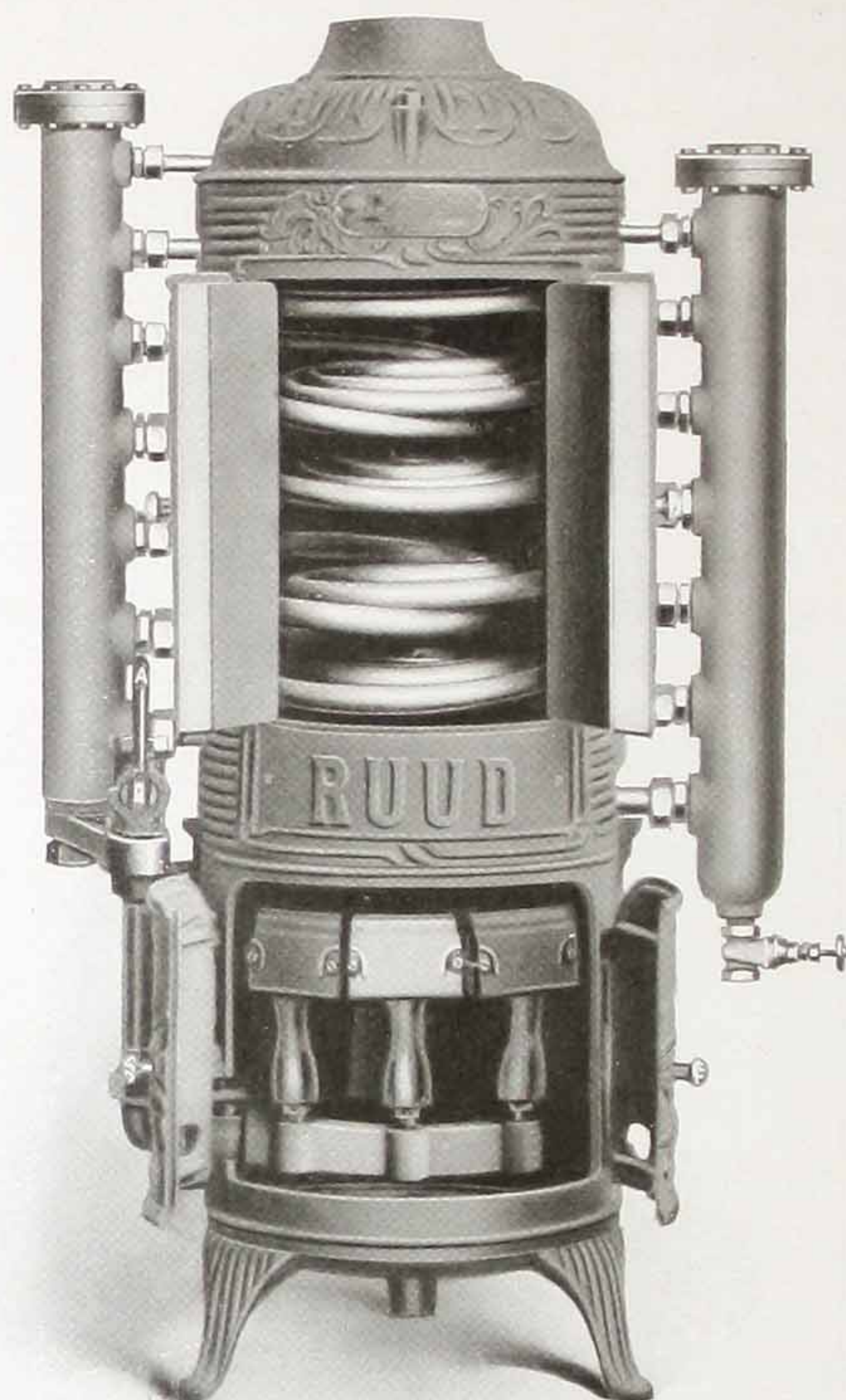
Eight gallons of hot water to each cent's worth of gas used, based on the average cost of artificial gas at 80 cents per thousand cubic feet. Most economical and efficient.

Specially adapted to tank or low pressure conditions, due to the fact that there is no resistance to the flow of the water, and the hot water can be had at any point where the cold water will flow, and with the same rapidity.

Suitable for apartment houses having large hot water tank, heated by steam coil or other heating device operated in *cold weather*, but not feasible in warm or mild weather.

As an efficient gas water-heating auxiliary under such conditions, the Ruud Heater, with the Thermostatic Moment-Valve, is an ideal system, supplementing the other when called upon, and furnishing large quantities of clean, hot water at low expense for gas, working automatically, requiring no attention, and without heating up the basement or building.

Many architects who specify steam heating systems in their flat-building work, specify a Ruud Storage Tank, fitted with *copper* steam coil (designed to be heated in winter from steam plant) and a Ruud Gas Storage Heater with Moment-Valve for auxiliary heating when steam plant is shut down, temporarily or otherwise (see illustrations on pages 12 and 20).



Showing the Heater with doors opened

The Ruud Thermostatic Moment-Valve or Temperature Regulator

The principle of the Ruud Thermostatic Moment-Valve is as simple as it is effective. A copper expansion pipe projects into the center of the tank, and is thus exposed to the temperature of the water stored therein. Temperature changes in the water of 25° Fahrenheit affect this tube to the extent of causing it to *expand* or *contract*, i. e., *lengthen* or *shorten*, a natural law—positive and sure. These changes in length are multiplied by compound levers in connection with a simple mechanism, so that the thermostatic movement causes a *positive* and *quick opening* or *closing* of the valve, thus controlling the gas supply to heater in exact accordance with the amount of heat required in the water from time to time.

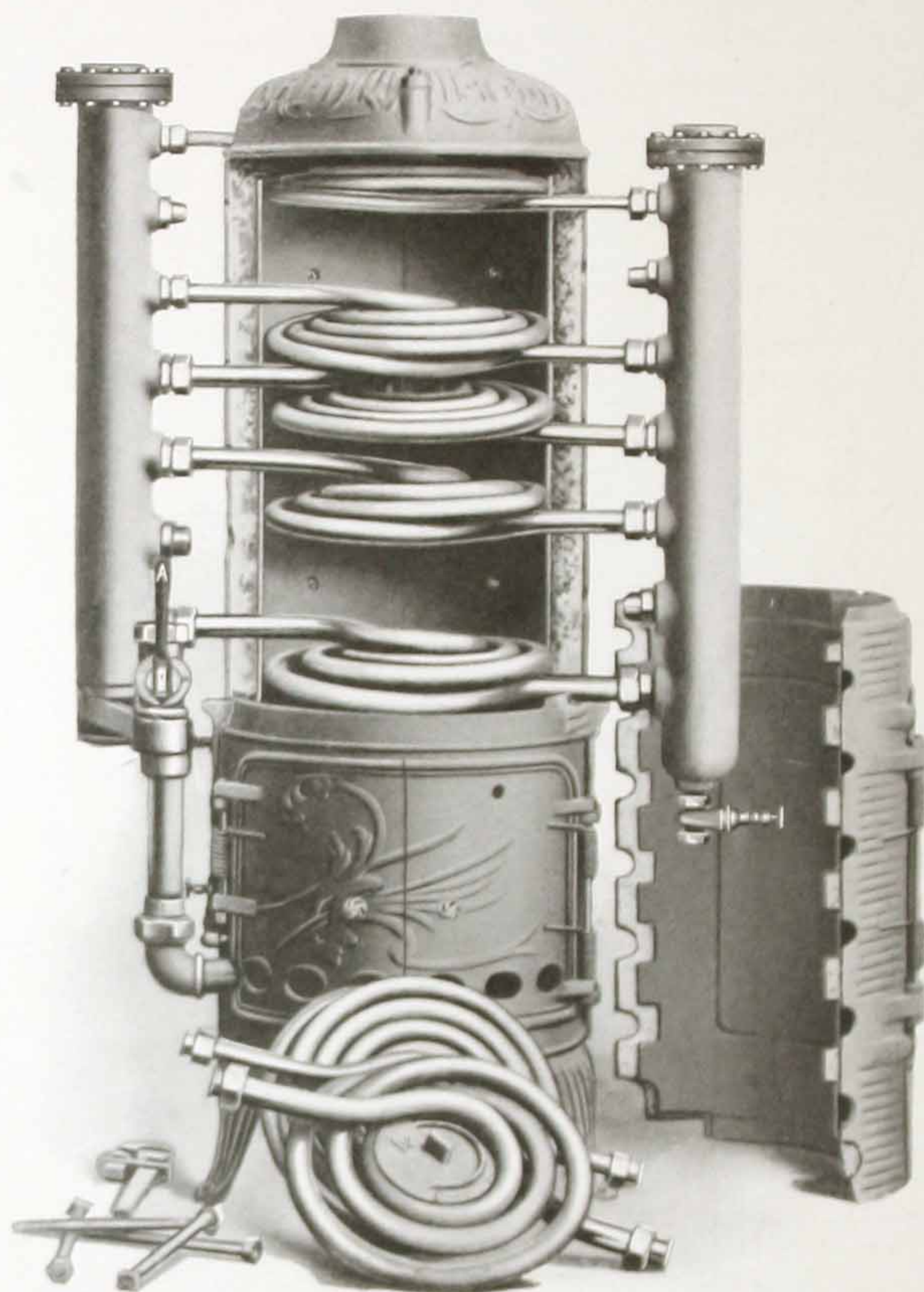
In brief, the hot water causes the thermostatic tube to *lengthen*, which movement *closes* the gas valve with a “snap” action. As the tank cools off from withdrawal of hot water or otherwise, the copper tube *shortens*, thus *opening* the gas valve with a “snap” movement.

Our seventeen years' experience in designing and building thermostats has thus resulted in the invention and perfection of the Thermostatic Moment-Valve, which, as an efficient and economical temperature regulator, is superior to anything of the kind ever placed on the market.

A japanned iron cover is clamped securely over the valve stem, compound levers, etc., thus protecting the mechanism from any ordinary injury, accident or tampering, and insuring a compact and “fool-proof” device.

High Heating Efficiency

High instantaneous heating efficiency is obtained by the use of the “Manifold System” of independent, detachable *copper* heating coils, because practically every particle of heat generated by the powerful yet economical gas burners is actually utilized to produce *hot water*—there being absolutely no waste which can possibly be eliminated.



Showing Interior View — Front jacket can be removed and coils detached
in a few minutes' time

Every coil is constructed in accordance with the well-known Ruud principle—that of a “cone” or “staggered” shape.

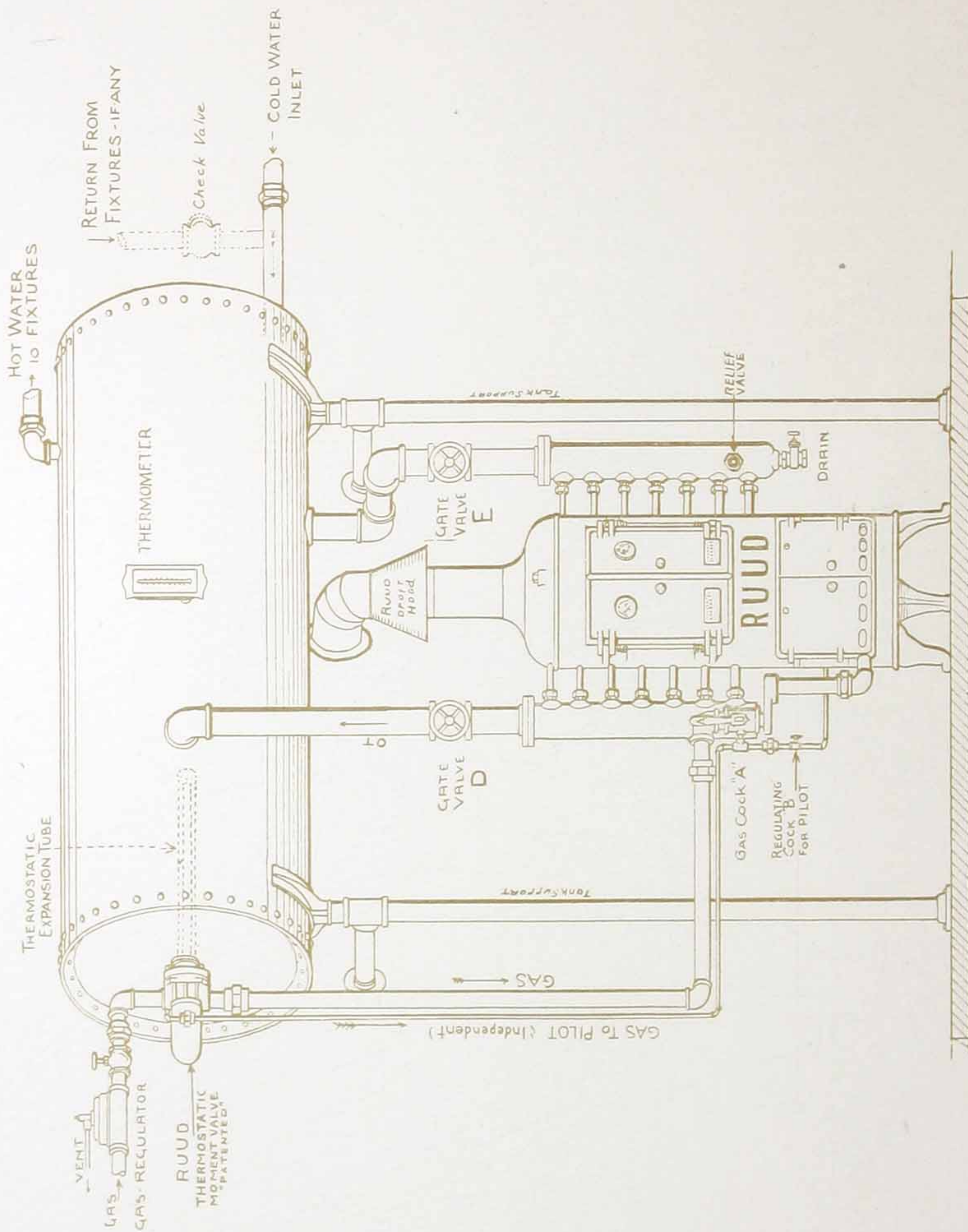
So-called “heat channels” or flue spaces through the coils are unknown in our Multicoil construction. The avenues for “heat losses” are thus entirely avoided.

The Multicoil Construction and its Advantages

The lower coils (nearest the burners) are of *larger diameter* and *shorter length* than the coils in the *middle* and upper part of *heat zone*. We therefore get the great advantage of larger circulation areas and shorter passageways where the heat is most intense, and *longer* coils of *smaller* diameter in upper portion of heater where it is desirable to retain the circulating water for a longer time.



Showing the Multi-Copper-Coil Construction
Front view



Showing how System is fitted up — Piping and circulators, etc. (Insulation of tank not shown but always required)

In our No. 200 heater, for instance, we have the coils graduated from top to bottom of manifolds, as follows :

One $\frac{5}{8}$ -inch diameter coil	Two $\frac{7}{8}$ -inch diameter coils
Two $\frac{3}{4}$ -inch diameter coils	Two 1-inch diameter coils

We also secure the great advantage of introducing the cooler "return" water in the *upper* part of the heat zone (as well as in lower portion) and thus maintain a marked difference between the temperature of the incoming water and the hot gases in upper half of heat zone. This gives an increased efficiency and marvelous heating capacity peculiar to our Multicoil system alone.

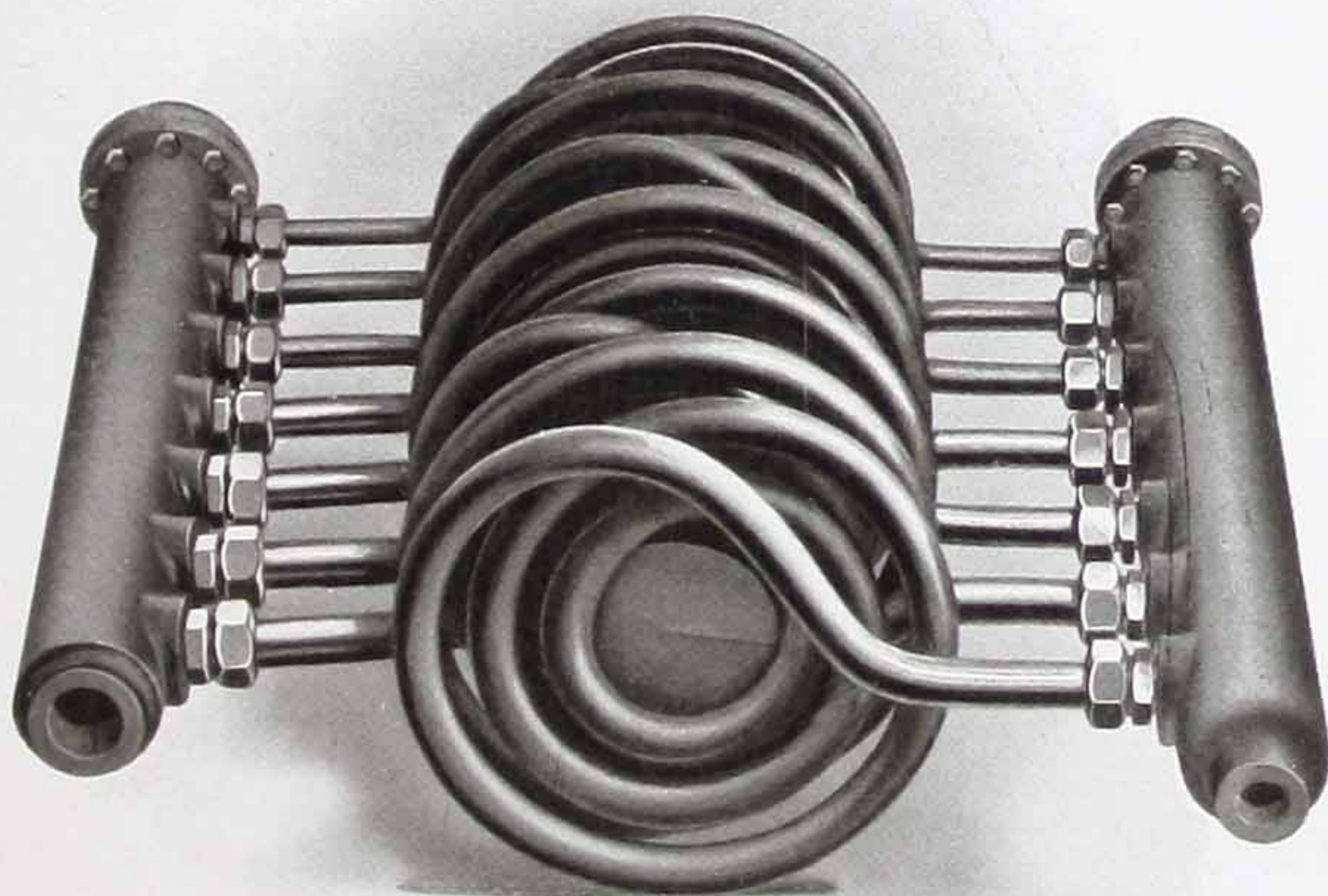
It can, therefore, be seen that every unit of generated heat is used to the best advantage.

We *guarantee 65% heating efficiency*, the highest *guaranteed efficiency* ever given on an automatic gas storage system.

Just think, 65% of the total heat energy of the gas is directly transmitted to the water to raise its temperature !

While our factory tests show an efficiency ranging from 67 to 70%, the above guarantee insures a *practical 65% working efficiency*.

Measured from every standpoint—gas efficiency, heating power, perfect automatic control, etc.—the Ruud System is in a class by itself. Not the cheapest in first cost, but decidedly the cheapest in the end, many times over.



Bottom View of the Coils — Note the heating surfaces

Perfect Automatic Control

How the "Chimney Losses" are Eliminated

The Ruud Thermostatic Moment-Valve is designed to operate under a variation of 25° Fahrenheit in temperature of water in the *center of tank*, for the express purpose of eliminating "chimney losses" by keeping the heater *inoperative* and *cold* most of the time, doing away with the otherwise continuous "chimney losses" found in all previous constructions.

It is designed to *not* maintain any circulation through heater *when no gas is being burned at main burners*. Otherwise, the heated water circulating through the copper coils would be constantly lowered in temperature, due to the up-draft through heater, which would exercise a "chilling" influence on the coils, and much of the heat stored in the water would be gradually drawn off into the chimney and lost.

Get this point firmly fixed in your mind: The Ruud System always acts as a hot water *generator*, and never under the reverse action of a *heat radiator*.

In all previous constructions it has been found impossible to avoid the feature of "chimney losses," and the amount of heat carried off by the draft, due to the constant radiation from heating surfaces when the heater was in partial operation, has been a great drawback, and has lessened the gas efficiency of other systems to such an extent as to make them impracticable.

In the Ruud System when the heater is not in actual operation, *there is no circulation* and no heated water in the coils. Consequently, no loss of heat can take place.

The saving of gas effected through this superior automatic regulation is an ill-important consideration.

The pilot or "ignitor," which is maintained constantly, is set to a very small flame, as same simply serves as a "lighter" to the other burners, and has no heating function whatever to perform.

Operation

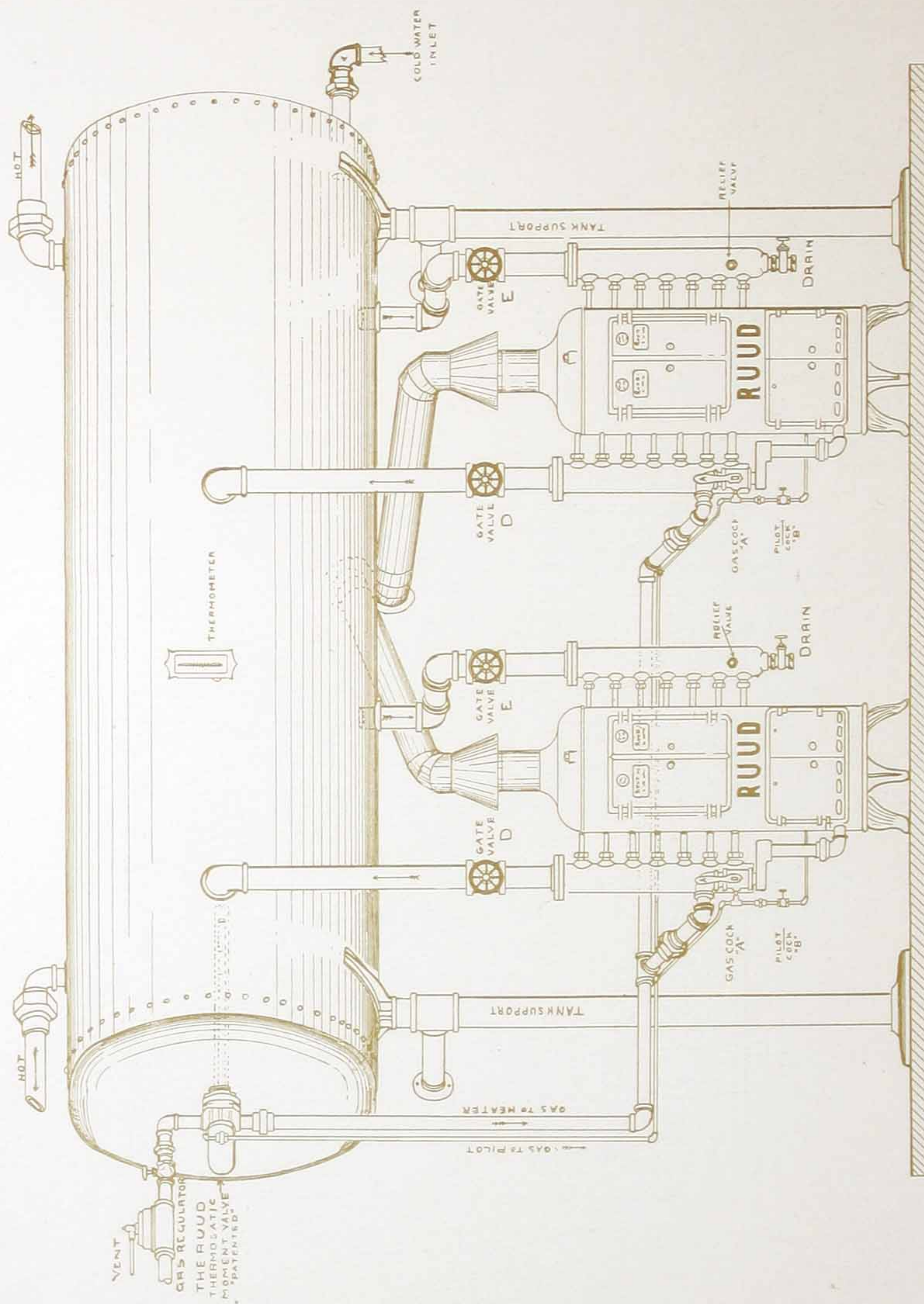
The water in *upper* portion of tank is always automatically held up to the temperature for which the Thermostatic Moment-Valve is set, usually 150° Fahrenheit.

When hot water is withdrawn from tank, the replacing cold water gradually fills the lower portion of tank until a 25° change of temperature takes place in the *center of tank*. The Thermostatic Moment-Valve then automatically turns on the gas, which heats the water passing through the copper heating coils. Thus the heating operation continues until the entire tank is heated to the proper temperature, when the Thermostatic Moment-Valve automatically shuts off the gas, quickly and positively, and stops the operation absolutely until necessity again demands the generation of more hot water.

In brief, the gas is either *all on* or *all off*, depending on the quantity of hot water in tank, as *no* gas is turned on until from one-third to one-half of tank capacity of hot water is withdrawn. The features of "chimney losses" and "coil radiation" are practically eliminated. Also, inasmuch as there is a full flow of gas to burners when heater is in operation, the feature of "flickering" at burners, with the consequent danger of "flashing" to air mixers, is eliminated.

The multiplicity of copper coils, with ample circulation areas and exceptionally large amount of heating surface, in conjunction with the powerful Ruud "Bunsen" gas burners, and the advantages gained through the operation of our Thermostatic Moment-Valve, gives a practical hot water storage service with the smallest consumption of gas ever known.

These features are covered by broad patents, and can be found in no other system on the market. The illustration on page 12 shows the mechanical data in connection with the Ruud System. Note the compact and convenient arrangement.



Showing the Ruud "Duplex" Multi-Copper-Coil Storage System. (Insulation of tank not shown but always applied)
(See application, page 18; and specification, page 26)

Mechanical Data

Ruud Charcoal Iron Storage Tanks

TANKS.—The shells of these tanks are made of heavy charcoal iron (not steel), tested to 200 pounds water pressure, and guaranteed for a working pressure of 100 pounds. These tanks are vastly superior to the ordinary steel tanks commonly used.

All seams are carefully riveted, and each tank is finished with a coat of asphalt paint. These tanks are especially constructed to our specifications.

Where the tanks are desired *galvanized*, we supply the same extra heavy charcoal iron construction, tested to 200 pounds water pressure and coated with a heavy covering of galvanizing.

COVERING.—We require that all tanks be insulated with a two-inch covering of magnesia or asbestos, which minimizes the loss of heat through radiation from sides of tank and increases the general efficiency.

CONNECTIONS.—All tanks over 120 gallons are provided with an extra set of circulator connections, permitting the connecting of heater to either end of tank as most convenient, and allowing for the attaching of an additional Ruud Heater, should it ever become desirable to increase the capacity of system. We can also furnish these tanks fitted with copper steam coils, where required (see page 30).

Ruud Copper Storage Tanks

We also furnish guaranteed *copper* tanks for our systems when desired. Their great lasting qualities sometimes make them more desirable, in spite of their increased cost over iron. Our charcoal iron tanks, however, are used in about nine out of ten Ruud installations, and leave little to be desired.

Ruud Gas Burners

These patented gas burners are remarkable for their intense heating power. The burners are so constructed that the flame



is distributed in two rings directly against the copper coils, without the flame from any one burner impinging upon the adjoining burners. This also avoids over-

heating of the cast-iron shell enclosing burners.

Brass set screws and *brass* bolts are used throughout, so that the burners can be removed and easily taken apart after years of service.

Copper Heating Coils

The design and general arrangement of the Ruud Copper Coils is such as to eliminate entirely the presence of brazed joints or threaded joints in heat zone.

Consequently, any coil in the system can be easily and quickly disconnected and removed for the purpose of cleaning or replacing of coils damaged through accident (see illustration, page 10). The repair item is therefore a simple and inexpensive one.

Where "hard" or sedimentary water is encountered, this feature of detachable, cleanable coils is invaluable.

The Ruud "Duplex" Storage System

(For Large Requirements)

The connecting of *two* heaters to one tank not only doubles the *heating capacity*, but also gives the great advantage of enabling one heater to be temporarily shut down for cleaning or repairs,

without stopping the hot water service. The other heater can carry the work under such emergencies, and vice versa. When the demands on the hot water service are light at certain times, the one heater can be shut down or they can be worked alternately.

These advantages are especially valuable in hospitals, hotels and places where any temporary interruption to the hot water service would cause great inconvenience (see cut, page 16).

Jacket or Shell with Self-Closing Doors

The jacket body of the heater is made with two heavy cast-iron walls, one within the other. The lower space between the two walls is packed with 85% magnesia insulation, a Ruud method of minimizing heat loss through radiation.

Doors provided with self-closing springs, at both upper and lower portions of jacket, render quick and easy access to all parts.

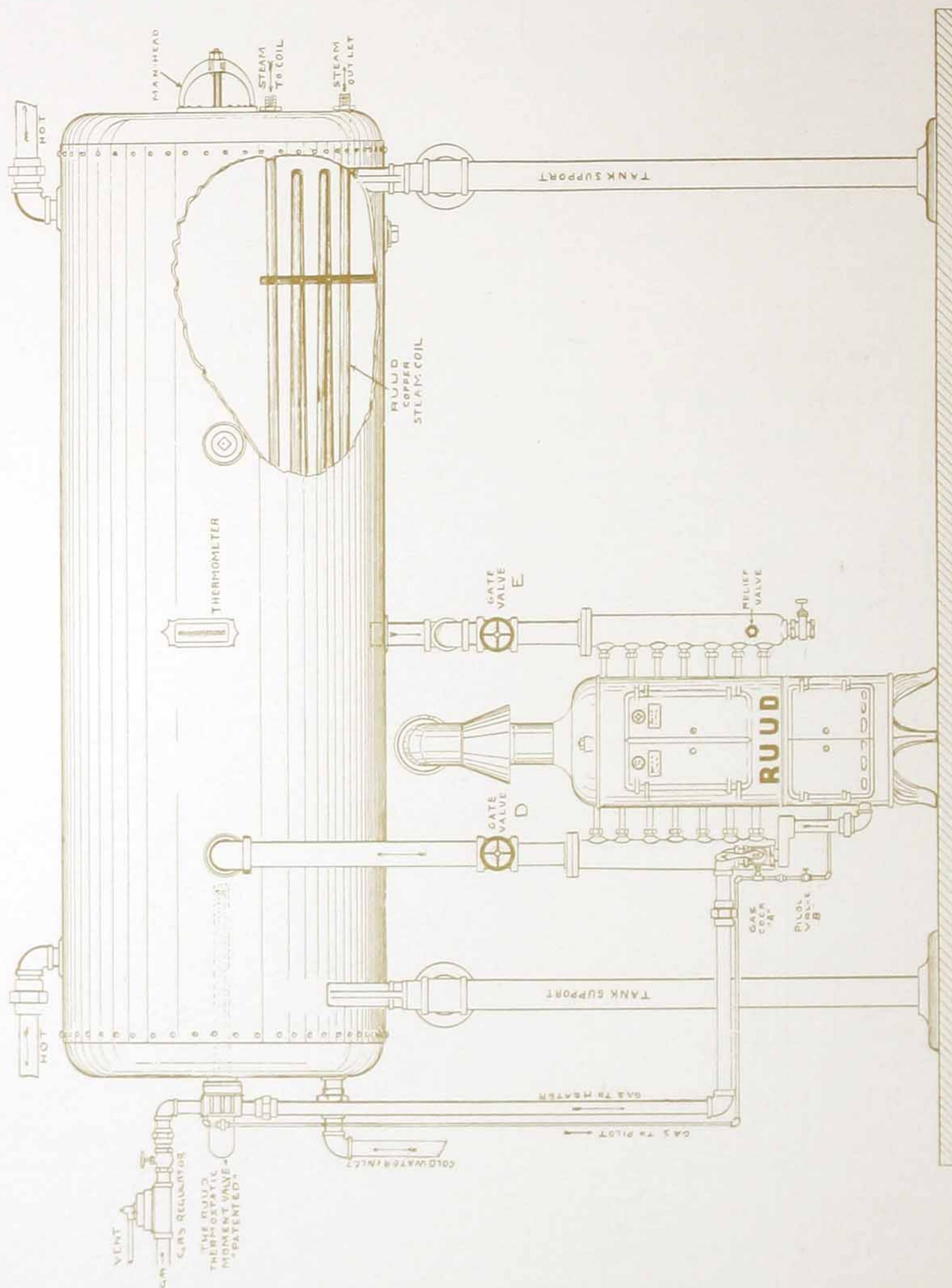
These self-closing doors are an admirable feature in that there can be no chilling of coils by influx of cold air through doors being carelessly left open, and all danger to clothes or person from the gas flames is eliminated.

Expansion and contraction of the iron shell does not interfere in any way with the proper closing of the doors, as owing to their *flexible* nature they adapt themselves to any and all changes in temperature.

The entire front half of the jacket can be quickly and easily removed for the purpose of cleaning and repairs (see illustration on page 10).

Relief Valve

Every heater is fitted with a "relief valve" which acts as a safety attachment should the system, through accident to the automatic regulation, ever become filled with steam. This "emergency" valve opens up at 150 pounds pressure, removing even the small element of danger that might result from unauthorized tampering with the thermostat.



Showing the Ruud Combination Steam Coil and Automatic Gas Hot Water Storage System. Especially adapted for apartment buildings and large residences having steam heating system (see pages 7, 26 and 30).

RUUD MULTI-COPPER-COIL AUTOMATIC STORAGE SYSTEM

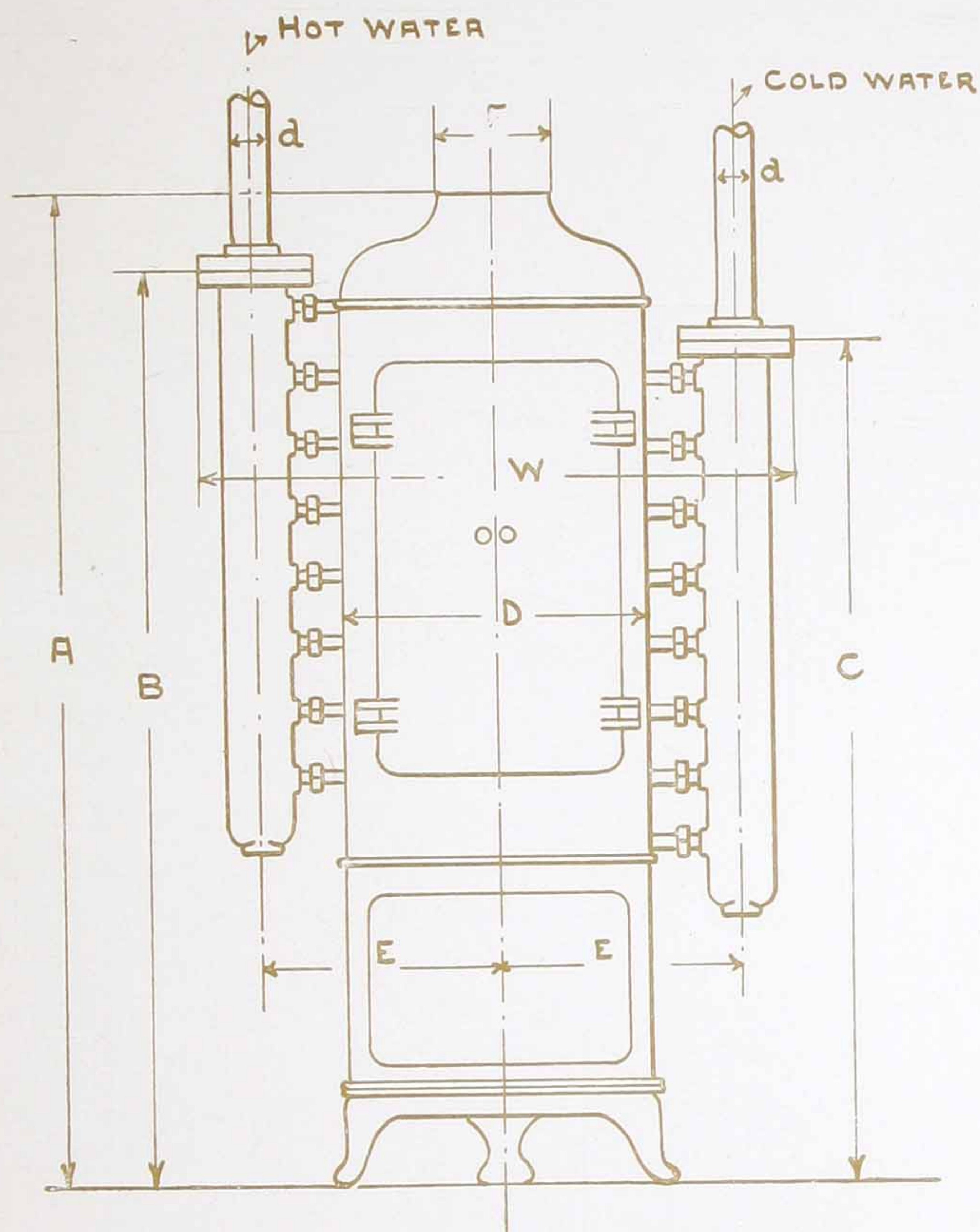
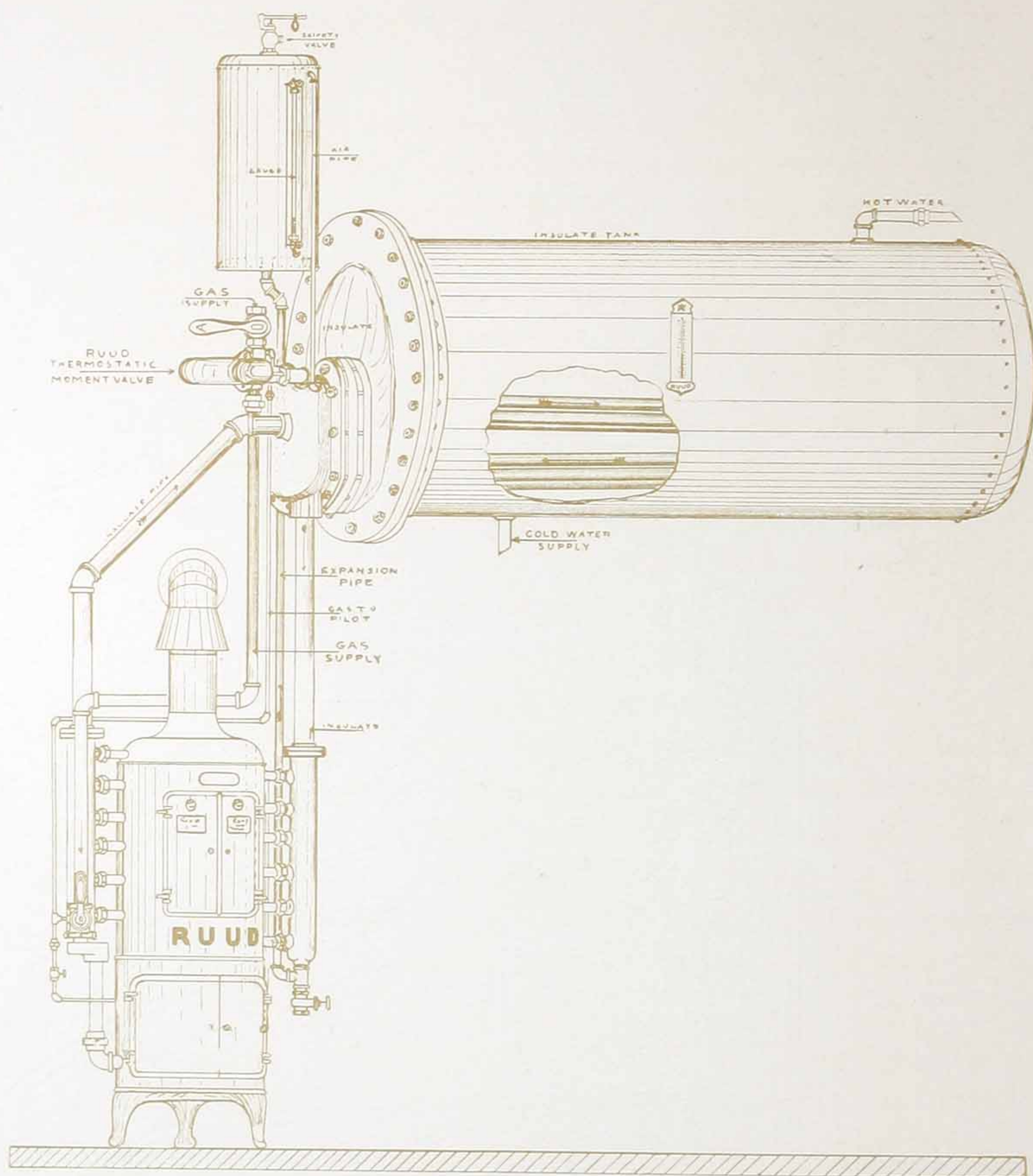


Table of Multicoil Heater Dimensions

No.	A	B	C	D	E	F	d	W
100	45"	41 ³ / ₄ "	37 ³ / ₄ "	12 ¹ / ₂ "	10 ³ / ₄ "	4"	1 ¹ / ₂ "	27"
200	49 ⁷ / ₈ "	46 ⁵ / ₈ "	42 ¹ / ₂ "	14"	11 ³ / ₄ "	6"	2"	29 ¹ / ₂ "
300	53 ³ / ₈ "	49 ¹ / ₂ "	45 ¹ / ₂ "	16"	13"	6"	2"	32"
400	61"	56 ¹ / ₄ "	52"	18 ¹ / ₂ "	14 ³ / ₄ "	7"	2 ¹ / ₂ "	36 ¹ / ₂ "
500	64 ¹ / ₈ "	58 ¹ / ₂ "	53 ¹ / ₂ "	20 ¹ / ₂ "	15 ³ / ₄ "	8"	2 ¹ / ₂ "	38 ¹ / ₂ "

RUUD MANUFACTURING COMPANY



Showing how Hard Water Storage System is fitted up
Piping, circulators and reservoir insulation not shown, but always required

Multicoil Storage System for Hard Water

In districts where hard water is the only supply available, the question of supplying hot water is indeed a very troublesome one.

A careful study of the drawing on the opposite page illustrates an entirely new and unique method of successfully utilizing hard water for all domestic purposes. System consists of heating coils in the heater and circulating coils in the tank. A small reservoir of ten gallons capacity is kept filled with soft water. The circulation of soft water at a high temperature radiates sufficient heat from the coil in the tank to raise the temperature of the hard water in the tank to 150° Fahrenheit in a comparatively short time, with a moderate amount of fuel.

This system is furnished complete, consisting of Multicoil Heater, specially constructed iron tank (black or galvanized) with cast-iron head, and soft water reservoir.

While the efficiency of this system is not as high as the direct circulation, owing to the high temperature it is necessary to work in, the results obtained more than offset this loss, namely, the successful use of hard or calciferous water, which means freedom from hot water troubles—abundant supply at a good hot temperature. The system is entirely automatic, requiring absolutely no attention, the operation in general being the same as the direct circulating system.

Those who have had experience with hard water supply fully appreciate the difficulty of providing a satisfactory hot water service, and will readily recognize the wonderful advantage derived from our improved method.

The strong guarantee embodied in the catalogue covers this system as well as the direct circulating system.

The hard water storage system is made in sizes consisting of 80, 100, 120, or 150 gallon tank, with No. 100 or No. 200 storage heater. Prices upon application.

Sample Specifications and Recommendations for Ruud Multi-Copper-Coil Storage Systems

Model Specification for a No. 100 System

“One 100-gallon extra heavy Ruud Charcoil Iron Tank, to be supported securely in horizontal position on Ruud Tank Supports and fitted in automatic connection with one No. 100 Ruud Multi-Copper-Coil Storage Heater and Ruud Thermostatic Moment-Valve, using a 1½-inch (brass or galvanized) pipe as circulators between heater and tank, with 1½-inch gate valves and elbows; the system to be fitted up in exact accordance with Ruud Manufacturing Company's printed directions and instructions, running ¾-inch gas line to heater, with unions and ¾-inch gas cock in same. A 4-inch independent flue pipe with Ruud Draft Hood to be run from heater to chimney having good draft. Cover tank with 2-inch wall of 85% Ruud magnesia insulation, canvassed.”

Price of system (exclusive of circulators and fitting up), \$201.75

NOTE.—Tank can be of 80, 100, 120 or 150 gallons capacity as selected.

(See Price List, page 28)

SUITABLE FOR

Residences having two or three baths, one shower bath, kitchen, pantry and laundry.

Flat-buildings having from three to six apartments of from four to six rooms each.

Model Specification for a No. 200 System

“One 150-gallon extra heavy Ruud Charcoal Iron Tank, to be supported in horizontal position on Ruud Tank Supports, and fitted in automatic connection with one No. 200 Ruud Multi-Copper-Coil Storage Heater and Ruud Thermostatic Moment-Valve, using 2-inch (brass or galvanized) pipe as circulators between heater and boiler, with 2-inch gate valves, and elbows. System to be fitted up in exact accordance with Ruud Manufacturing Company's printed directions and instructions, running direct 1-inch gas line to heater, with 1-inch gas cock in same. A 6-inch independent flue pipe with Ruud Draft Hood to

RUUD MULTI-COPPER-COIL AUTOMATIC STORAGE SYSTEM

be run from heater to chimney having good draft. Cover tank with 2-inch wall of 85% Ruud magnesia insulation, canvassed."

Price of system (exclusive of circulators and fitting up), \$259.50

NOTE.—Tank can be of 100, 120, 150, 200 or 250 gallons capacity, as selected.

(See Price List, page 28)

SUITABLE FOR

Large residences having from three to six baths, one or two showers, kitchen, pantry, laundry, etc.

Flat-buildings having from six to twelve apartments, averaging five or six rooms, kitchen and bath in each.

Small hotels having from three to five baths, not over ten bedroom lavatories, kitchen, laundry, etc.

Model Specification for a No. 300 System

"One 200-gallon extra heavy Ruud Charcoal Iron Tank, to be supported in horizontal position on Ruud Tank Supports, and fitted in automatic connection with one No. 300 Ruud Multi-Copper-Coil Storage Heater and Ruud Thermostatic Moment-Valve, using 2-inch (brass or galvanized) pipe as circulators between heater and boiler, with 2-inch gate valves and elbows; the system to be fitted in exact accordance with Ruud Manufacturing Company's printed directions, running direct 1 1/4-inch gas line to heater, with 1 1/4-inch gas cock in same. A 6-inch independent flue pipe with Ruud Draft Hood to be run from heater to chimney having good draft. Cover tank with 2-inch wall of 85% Ruud magnesia insulation, canvassed."

Price of system (exclusive of circulators and fitting up), \$306.25

NOTE.—Tank can be 200, 250, 300, 350 or 400 gallons capacity, as selected.

(See Price List, page 29)

SUITABLE FOR

Large residences having from eight to fifteen baths, several showers, bedroom lavatories, kitchen, butler's pantry, laundry, etc.

Flat-buildings having from ten to eighteen apartments, averaging seven rooms and bath.

Hotels having from four to ten baths, not over fifty bedroom lavatories, kitchen, large laundry, etc.

Small gymnasiums having not more than ten to fifteen hot water outlets and a membership of not more than two hundred.

Model Specification for a No. 400 System

"One 300-gallon extra heavy Ruud Charcoal Iron Tank, to be securely supported in horizontal position on Ruud Tank Supports, and fitted in automatic connection with one No. 400 Ruud Multi-Copper-Coil Storage Heater and Ruud Thermostatic Moment-Valve. Use 2½-inch (brass or galvanized) pipes as circulators between heater and tank, with 2½-inch gate valves and elbows; the system to be fitted up in exact accordance with blue prints and directions furnished by Ruud Manufacturing Company, running independent 1¼-inch gas line to heater, with 1¼-inch gas cock in same. A 7-inch independent flue pipe with Ruud Draft Hood to be run from heater to chimney having good draft. Cover tank with 2-inch wall of 85% Ruud magnesia insulation, canvassed."

Price of system (exclusive of circulators and installation), \$405.25

NOTE.—Tank can be 300, 400, 500 or 600 gallons capacity, as selected.

(See Price List, page 29)

SUITABLE FOR

Large flats having from eighteen to twenty-four apartments, averaging seven rooms and bath.

Hotels having from ten to twenty bathrooms (use 500-gallon tank).

Gymnasiums having from twenty to thirty hot water outlets, and membership of not over five hundred (use 500-gallon tank).

Model Specification for a Ruud *Duplex* Storage System

(600-gallon tank and two No. 300 Multi-Copper-Coil Heaters)

(See illustration on page 16)

"One 600-gallon extra heavy Ruud Storage Tank, as furnished by Ruud Manufacturing Company, to be securely supported on brick piers and fitted in automatic connection with two No. 300 Ruud Multi-Copper-Coil Storage Heaters and Ruud Thermostatic Moment-Valve in exact accordance with blue prints and instructions furnished by Ruud Manufacturing Company. Each heater must be fitted with 2-inch galvanized circulators to tank, using 2-inch gate valves, galvanized, and fittings. The gas service to system must be not less than 1½-inch, with 1-inch branches to

RUUD MULTI-COPPER-COIL AUTOMATIC STORAGE SYSTEM

each heater, having 1-inch union and 1-inch gas cock in each. The cold water service to tank must be at least 1 $\frac{1}{4}$ -inch, and hot supply from top of tank must be at least 1 $\frac{1}{4}$ -inch. A 6-inch independent vent pipe, with Ruud Draft Hood inserted, to be run from each heater to independent chimney hole having good draft (no joining of flue pipes allowed).

Price of system (exclusive of circulators and installation), \$587.00

NOTE.—Tank can be either 400, 500, 600, 700, 800 or 1000 gallons capacity,
(Prices on application)

SUITABLE FOR

Large hotels, large hospitals, office buildings, bath houses, large gymnasiums,
and other places requiring immense quantities of hot water.

Many Duplex Systems are used with two No. 200 heaters, and for exceptionally heavy requirements two No. 400 are used, mostly with 1000-gallon tanks.

NOTE

Where a Ruud System is to be used in connection with *steam* plant, simply insert after the words "One — gallon Ruud Storage Tank," the following:

"Equipped with Ruud Copper Steam Coil and yoke man-head," and then in heating specifications provide for the steam circulating connections to the Ruud System, with or without the Ruud Steam Regulator, as desired.

Ruud Multi-Copper-Coil Storage Systems are usually sold *complete* (with tank insulation required in all cases), but where Ruud Multi-Copper-Coil Heaters and Ruud Thermostatic Moment-Valves are to be used for special purposes as for residences, apartment buildings, etc., *already having suitable tank installed*, prices on heater and automatic valve are as per table on page 30. Such installations, however, must be made in exact accordance with directions and blue print furnished from our home office. This is a condition of every sale.

Price List of Complete Systems, including No. 100 Ruud Storage Heater, Ruud Thermostatic Moment-Valve, Storage Tank, Thermometer, Supports for Tank and 85% Magnesia Insulation, applied

Heating Capacity of Heater in Gallons per Hour	Capacity of Tank in Gallons	Dimensions of Iron Tanks	Size of Circulating Pipes	Size of Hot Supply to House, also Cold Inlet to Tank	Complete with No. 100 Heater, Black Charcoal Iron Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation	Complete with No. 100 Heater Galvanized Charcoal Iron Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation	Complete with No. 100 Heater, Standard (200 lb. test) Copper Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation	Complete with No. 100 Heater, Extra Heavy (300 lb. test) Copper Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation
100	80	5' x 20"	1 1/2"	1"	\$194 60	\$201 20	\$252 90	\$280 40
100	100	5' x 22"	1 1/2"	1 1/4"	201 75	208 25	304 85	332 35
100	120	5' x 24"	1 1/2"	1 1/4"	211 65	219 35	342 00	369 50
100	150	6' 4" x 24"	1 1/2"	1 1/4"	226 50	238 60	372 80	400 30

Price List of Complete Systems, including No. 200 Ruud Storage Heater, Ruud Thermostatic Moment-Valve, Tank, Thermometer, Supports for Tank and 85% Magnesia Insulation, applied

Heating Capacity of Heater in Gallons per Hour	Size of Tank in Gallons	Dimensions of Iron Tanks	Size of Circulating Pipes	Size of Hot Supply to House, also Cold Inlet to Tank	Complete with No. 200 Heater, Black Charcoal Iron Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation	Complete with No. 200 Heater, Galvanized Charcoal Iron Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation	Complete with No. 200 Heater, Standard (200 lb. test) Copper Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation	Complete with No. 200 Heater, Extra Heavy (300 lb. test) Copper Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation
200	100	5' x 22"	2"	1 1/4"	\$234 75	\$241 35	\$334 85	\$362 35
200	120	5' x 24"	2"	1 1/4"	242 45	261 15	371 70	399 20
200	150	6' 4" x 24"	2"	1 1/4"	259 50	271 60	405 80	433 30
200	200	8' 6" x 24"	2"	1 1/2"	278 75	302 90	474 55	502 05
200	250	7' x 30"	2"	1 1/2"	296 90	333 20	. . . .	608 20
200	300	8' x 30"	2"	1 1/2"	311 75	362 35	. . . .	. . . .

Storage systems are sold complete, but price does not include circulating pipes or installation. Separate Storage Heaters with Automatic Device supplied only for old buildings having tanks already installed (see prices, page 30).

All tanks are regularly placed horizontal. Vertical tanks, however, in either iron or copper, can be furnished where conditions require. Prices of vertical systems quoted on application. We will also give exact dimensions of *copper* tanks on request, the above dimensions applying to iron tanks only.

Brass pipe circulators between heater and tank are preferred, but *galvanized iron* pipe will answer the purpose in most cases.

We are always glad to make recommendations as to proper size system to use for residences, apartment houses, etc., and when our specifications are adopted, satisfactory results guaranteed.

See sample specifications on page 24.

RUDD MULTI-COPPER-COIL AUTOMATIC STORAGE SYSTEM

Price List of Complete Systems, including No. 300 Ruud Storage Heater, Ruud Thermostatic Moment-Valve, Tank, Thermometer, Supports for Tank and 85 % Magnesia Insulation, applied

Heating Capacity of Heater in Gallons per Hour	Size of Tank Gallons	Dimensions of Iron Tanks	Size of Circulating Pipes	Size of Hot Supply to House	Complete with No. 300 Heater, Black Charcoal Iron Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation	Complete with No. 300 Heater, Galvanized Charcoal Iron Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation	Complete with No. 300 Heater, Standard (200 lb. test) Copper Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation	Complete with No. 300 Heater, Extra Heavy (300 lb. test) Copper Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation
300	200	8' 6" x 24"	2"	1 1/2"	\$306 25	\$330 45	\$502 05	\$529 55
300	250	7' x 30"	2"	1 1/2"	324 40	360 70	. . . .	635 70
300	300	8' x 30"	2"	2"	339 25	389 85	. . . .	. . . .
300	325	9' x 30"	2"	2"	351 35	. . . .	. . . .	. . . .
300	365	10' x 30"	2"	2"	357 95	. . . .	. . . .	. . . .

Price List of Complete Systems, including No. 400 Ruud Storage Heater, Ruud Thermostatic Moment-Valve, Iron Tank (extra heavy), Thermometer, Supports for Tank and 85 % Magnesia Insulation, applied

Heating Capacity of Heater in Gallons per Hour	Size of Tank Gallons	Dimensions of Tank	Size of Circulating Pipes, between Heater and Tank	Size of Hot Supply to House	Thickness of Shell	Thickness of Heads	Complete with No. 400 Heater, Extra Heavy Black Iron Tank, Thermometer, Supports for Tank, Thermostatic Moment-Valve, and 85 per cent. Magnesia Insulation
400	300	8' x 30"	2 1/2"	2"	1/4"	5/8"	\$405 25
400	365	10' x 30"	2 1/2"	2"	1/4"	5/8"	423 95
400	425	8' x 36"	2 1/2"	2"	5/8"	3/8"	430 00
400	500	9' 6" x 36"	2 1/2"	2"	5/8"	3/8"	454 20
400	575	8' x 42"	2 1/2"	2"	5/8"	3/8"	466 30

Storage systems are sold complete, but price does not include circulating pipes or installation. Separate Storage Heaters with Automatic Device supplied only for old buildings having tanks already installed (see prices, page 30).

All tanks are regularly placed horizontal. We will also give exact dimensions of *copper* tanks on request, the above dimensions applying to iron tanks only.

Brass pipe circulators between heater and tank are preferred, but *galvanized iron* pipe will answer the purpose in most cases.

We are always glad to make recommendations as to proper size system to use for residences, apartment houses, etc., and when our specifications are adopted, satisfactory results guaranteed.

See sample specifications on pages 25 and 26.

R U U D M A N U F A C T U R I N G C O M P A N Y

No.	Heating Capacity per Hour	Price
100	100 gallons	\$145 00
200	200 gallons	175 00
300	300 gallons	205 00
400	400 gallons	260 00

These prices include a Ruud Thermostatic Moment-Valve furnished along with heater.

NOTE.—Heating capacity based on raise of temperature in water of 67° Fahrenheit.

Copper Steam Coils for Ruud Tanks

Price List—Copper Coils only, fitted in Tank

Size of Tank	Price of Copper Steam Coil	Size of Tank	Price of Copper Steam Coil	Size of Tank	Price of Copper Steam Coil
80 gallons	\$22 00	200 gallons	\$37 00	425 gallons	\$72 00
100 gallons	24 00	250 gallons	46 00	500 gallons	80 00
120 gallons	27 00	300 gallons	55 00	600 gallons	90 00
150 gallons	30 00	365 gallons	63 00		

The Ruud Steam Coils are made from *heavy seamless copper tubes*, thoroughly tested, and guaranteed as to heating capacity, efficiency and durability. All joints are brazed and provided with brass nipples and lock-nuts. They are of ample size to heat water in tank in two hours' time, based on a raise of temperature of 100° Fahrenheit.

When steam coil is included, above prices are to be added to regular price of system. *Copper* steam coils are superior to *brass* coils, and cost slightly less. We can, however, furnish coils in either *brass* or galvanized iron pipe, when desired. Prices on application.

When steam coils are used, tank must be equipped with *man-hole*, and we make this in 11 x 15-inch yoke style, at \$15 additional. *Hand-hole* in tank, \$5 additional.

We recommend that the *Ruud Hot Water Steam Regulator* be used on tanks having steam coils, in order to insure a uniform

RUUD MULTI-COPPER-COIL AUTOMATIC STORAGE SYSTEM

temperature of the hot water, and to economize the use of the steam.

Price List of Ruud Automatic Steam Regulator

Steam Valve	Price	Steam Valve	Price
1"	\$50 00	2"	\$56 00
1 1/4"	52 00	2 1/2"	61 00
1 1/2"	54 00	3"	77 00

To Architects, Owners and Plumbers

We solicit correspondence and calls on any matters relative to Hot Water Systems. We offer you the benefit of our many years' experience in this work.

We are glad to consult with you at any time and assume all responsibility when our recommendations as to the capacities, manner of installing, etc., are followed out.

The Ruud Storage System is thoroughly guaranteed, has stood the test of time and practical usage, and is therefore worthy of your entire confidence.

Ruud Manufacturing Company

Makers of

Ruud Multi-Copper-Coil Automatic Storage Systems

Ruud Instantaneous Automatic Water Heaters

The Ruud Building, 336-338-340-342 Second Avenue

Pittsburgh, Pa.

Branch Offices in all Large Cities

(See page 2)

PHILADELPHIA BRANCH

1938 Market Street

Phones { Bell, Locust 26-65 A
Keystone, Race 58-30 A

The Proof

We have hundreds of letters in our files from prominent users of Ruud Systems, telling of the excellent satisfaction received from same. Space does not permit of the reproduction of these letters, but they are always open to inspection at our offices.

We have furnished over 2500 Ruud Storage Systems for various requirements, which may be classified as follows :

885	Residences
965	Apartment Buildings
172	Hotels
83	Hospitals
51	Colleges, Schools, etc.
51	Bath Houses, Gymnasiums, etc.
47	Restaurants
34	Factories
212	Miscellaneous

Get ye first an abundant and reliable water supply, and all other good and desirable things shall be added unto you.—SCIPIO CRAIG

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